



# **SAB/BOSC Meeting on Strategic Directions for EPA Research, 2016-2019**

**U.S. EPA's Office of Research and  
Development**

**Robert Kavlock, Ph.D.**  
Deputy Assistant Administrator for Science  
July 24, 2014



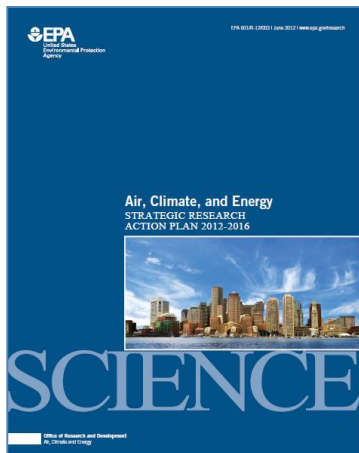
## This Presentation

- **ORD Strategic Directions 2016-2019**
- **ORD Cross-cutting Research**
- **Role of the SAB and the BOSC**
- **Charge to the SAB/BOSC**



# Strategic Research Action Plans 2012-2016

## Air, Climate & Energy



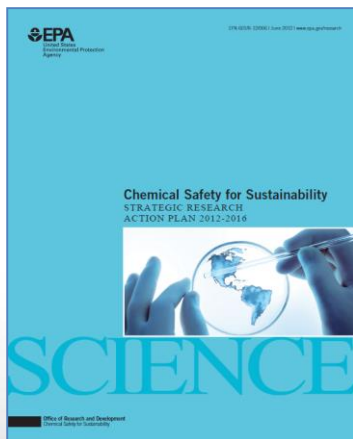
## Sustainable & Healthy Communities



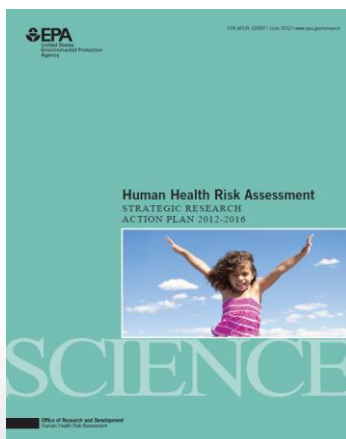
## Safe & Sustainable Water Resources



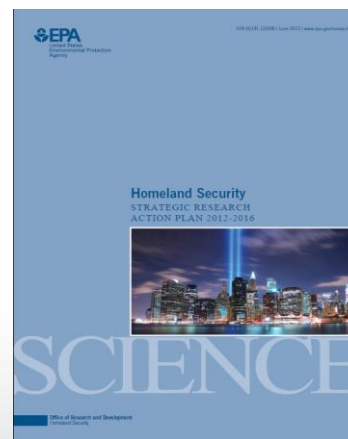
## Chemical Safety for Sustainability



## Human Health Risk Assessment



## Homeland Security





# Aligning Research with EPA Strategic Goals

## Cross-Agency Strategies

- Sustainable Future
- Visible Difference in Communities
- New Era of Partnerships
- High-Performing Organization

## EPA Goals 2014-2018

Addressing Climate Change and Improving Air Quality

Protecting America's Waters

Cleaning Up Communities and Advancing Sustainable Development

Ensuring the Safety of Chemicals and Preventing Pollution

Enforcing Laws, Ensuring Compliance

## Research Programs

Air, Climate & Energy

Safe and Sustainable Water Resources

Sustainable and Healthy Communities

Chemical Safety for Sustainability

Human Health Risk Assessment

Homeland Security



# Research Planning to Research Results

## Advisors and Stakeholders

EPA Programs  
and Regions

EPA Strategic  
Strategic  
Plan

Congressional  
Mandates

States, Tribes,  
Local governments  
Other stakeholders

External  
Science  
Advisors

Needs &  
Priorities

Strategic  
Research Action  
Plans

Research  
Priorities &  
Schedule

Feedback &  
Evaluation

Deliver  
Products

Conduct Research  
and Develop  
Products

Feedback



# ORD Organizational Chart

## Immediate Office of the Assistant Administrator

### National Program Directors

- Air, Climate and Energy
- Chemical Safety for Sustainability
- Safe and Sustainable Water Resources
- Sustainable and Healthy Communities
- Human Health Risk Assessment
- Homeland Security

Office of the  
Science Advisor

### Headquarters Offices

Policy and Administration

### National Research Laboratories and Centers

Health and  
Environmental  
Effects Lab

Exposure  
Research  
Lab

Risk  
Management  
Lab

Environmental  
Assessment  
Center

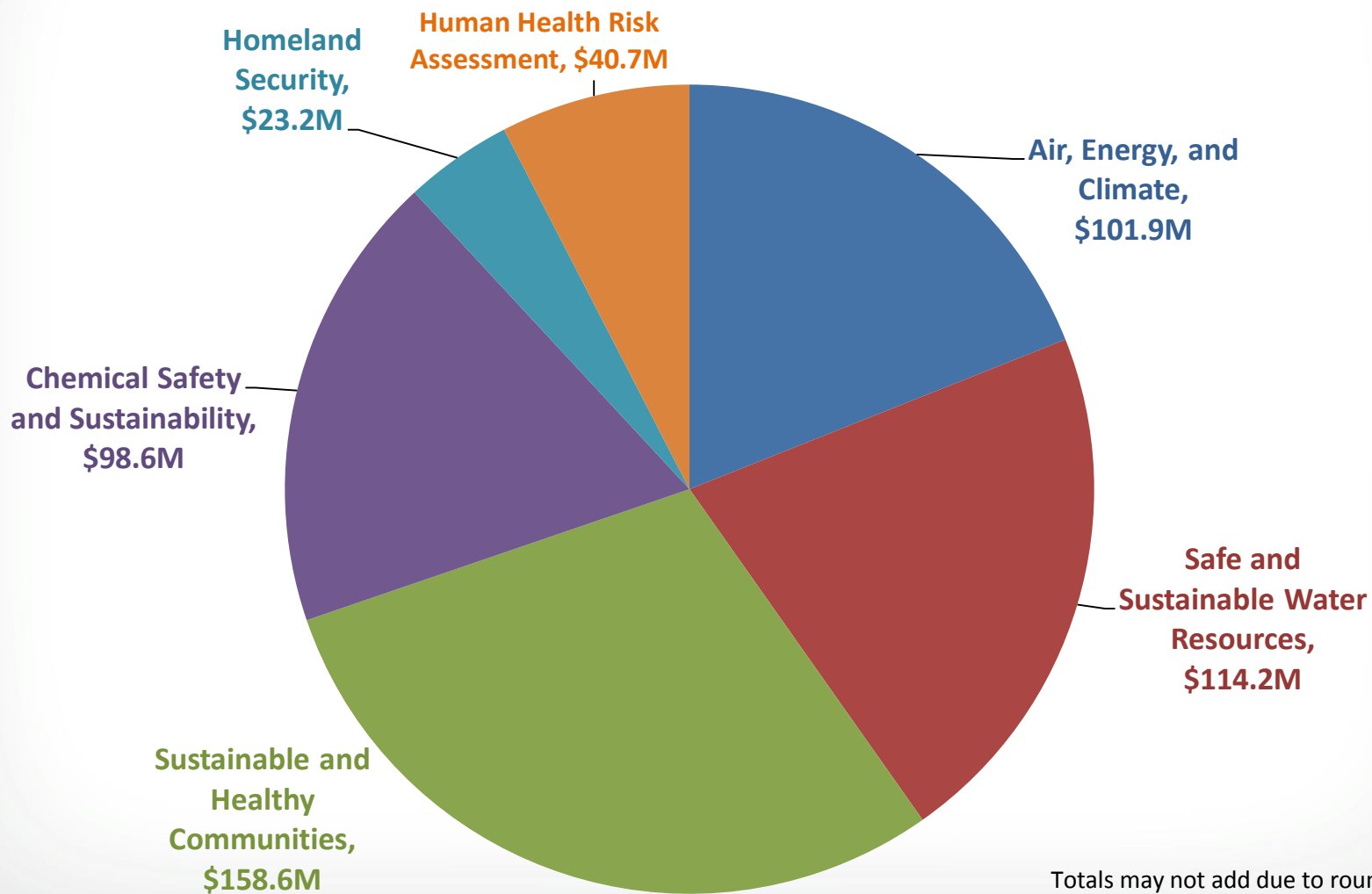
Computational  
Toxicology  
Center

Homeland  
Security  
Center

Environmental  
Research  
Center



# ORD's FY 2015 President's Budget by Research Program Projects



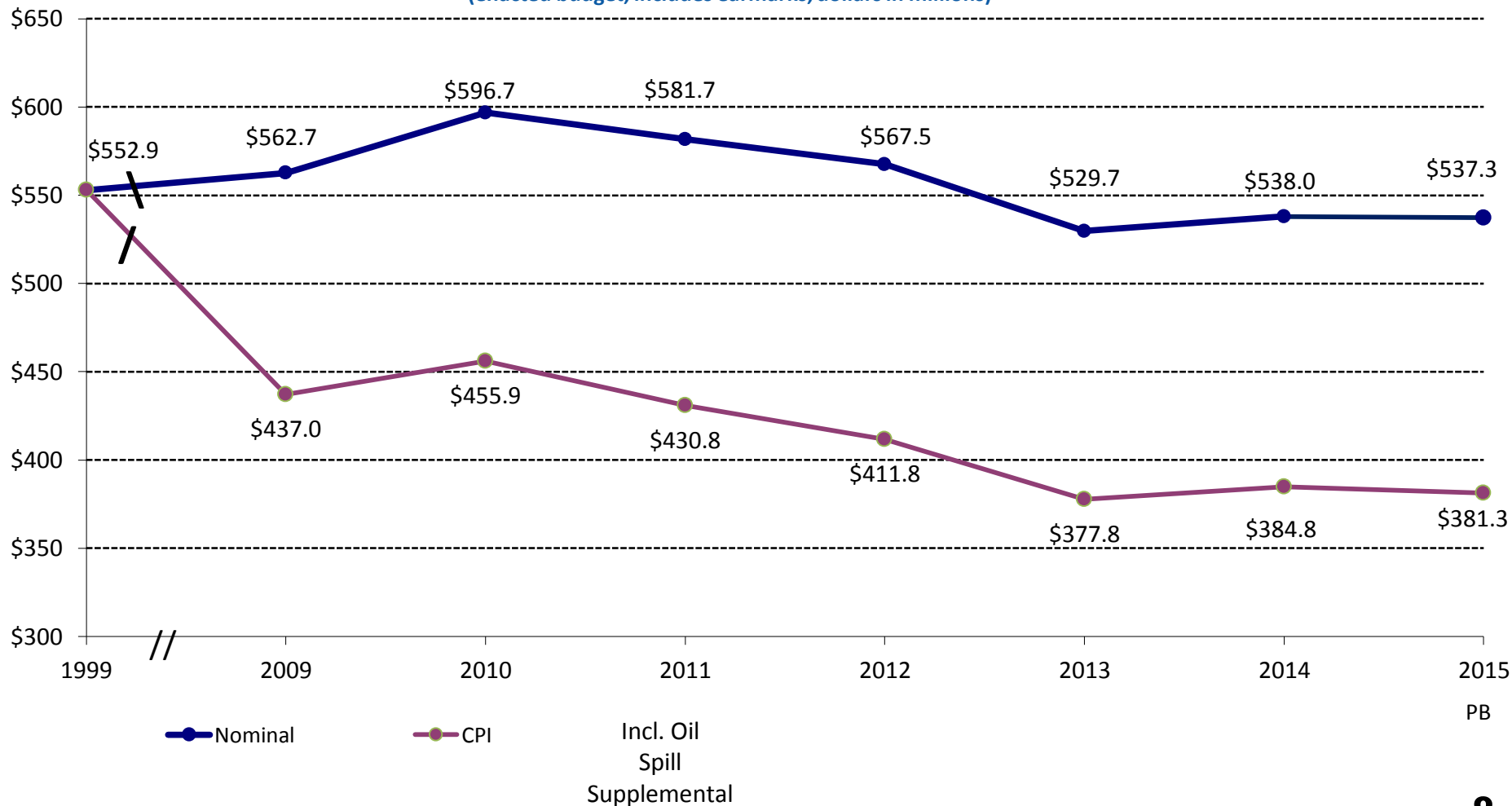
Totals may not add due to rounding



# ORD Resource Trends

## ORD Total Budget with Inflation Indices

(enacted budget, includes earmarks, dollars in millions)







# Becoming a High-Performing Organization

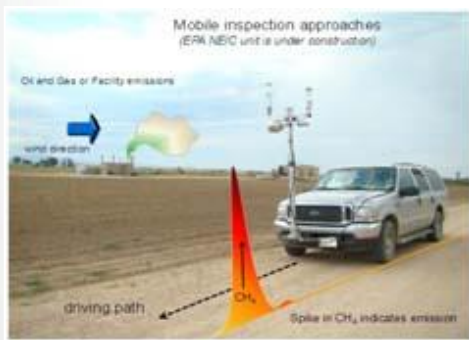
- **Re-orienting our research to sustainability: healthy environments v. acceptable risk**
- **Moving away from stove-pipes**
- **Promote systems thinking and innovation**
- **Relevant, responsive and timely research**
- **Emphasizing communication of our results**





# Next Generation Air Monitoring

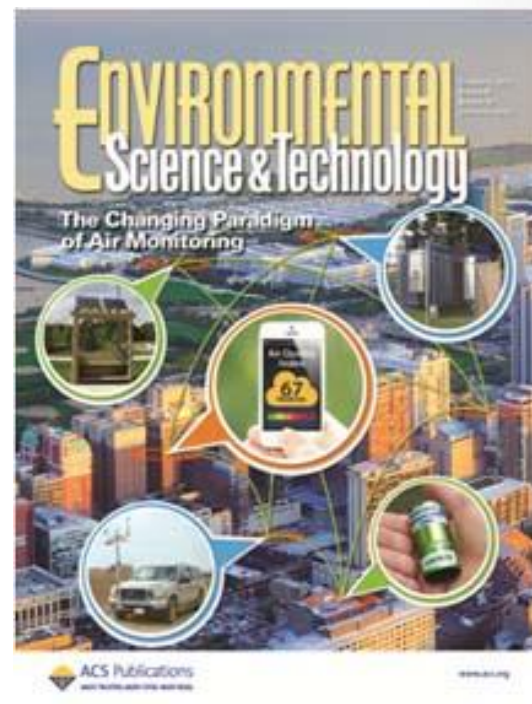
- **Developing and stimulating new technology**
- **Evaluating emerging sensor technology**
- **Promoting community participation in air monitoring**
- **Satellite-based air quality measurements**
- **Working with federal partners (NASA, NOAA, NSF)**



*Mobile monitoring for geospatial mapping of pollutants (GMAP)*



*“Village Green” park bench monitors air quality*



**My Air  
My Health**  
U.S. Department of Health and Human Services  
U.S. Environmental Protection Agency

- **Combine different types of data in new ways to characterize impacts of chemicals to human health and the environment**
- **Develop and apply rapid, efficient and effective chemical safety evaluation methods**
  - High throughput toxicology
  - Working with NIEHS, NCATS, FDA
- **Adopt a systems-based approach to examine the complex interactions among exposures and biological effects**
  - Virtual tissue models
- **Incorporate new science, methods and technologies into risk assessment**



- **What is a Strategic Research Action Plan (StRAP)?**
  - Describes our research program for internal and external audiences
  - Developed in consultation with advisors (SAB and BOSC), EPA partner offices, other stakeholders
  - Serves as our planning document; guides allocation of resources (\$ and people)
  - High level strategic document
- **Early Input from SAB and BOSC**
  - Preliminary Drafts: just beginning 2016-2019 StRAP updates
  - This kicks off the year long process with EPA partners and stakeholders
  - High level strategic plan; are we heading in the right directions?



# Cross-cutting Research



- Climate change



- Children's environmental health



- Nitrogen and co-pollutants

- Children's environmental health



- Environmental justice







# Roadmaps for Cross-cutting Issues

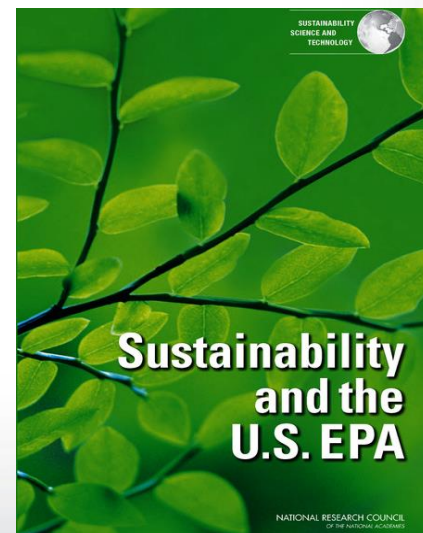
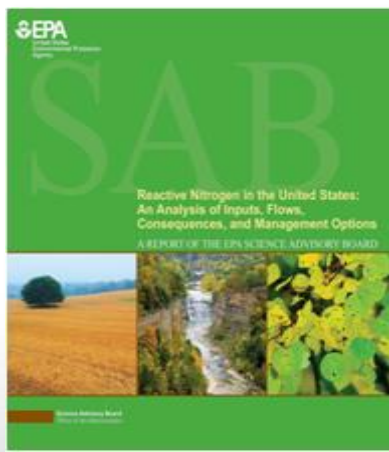
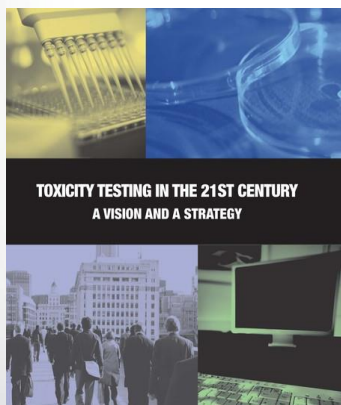
- **Purposes**
  - Describe coordination/collaboration with EPA and federal partners, and others
  - Show how research is integrated across the six programs; identifies gaps
  - Catalyze integration across the 6 programs
  - Focused on a small number of cross-cutting issues
- **Research Roadmaps at different stages of development**
  - Nitrogen and Co-Pollutants
  - Climate Change
  - Children's Environmental Health
  - Environmental Justice
- **Key Distinction from StRAPs**
  - Not creating additional research programs beyond the six
  - Do not serve as basis for resource planning
  - Informed by and inform the StRAPs



# Strengthening Our Science

## Strong commitment to quality science and peer review

- **EPA's Science Advisory Board**
  - Input on strategic directions for research; special topics
- **ORD's Board of Scientific Counselors**
  - Advice on program operations
  - Ongoing advice through new subcommittees for research programs
- **National Academy of Sciences**
  - Provides recommendations on special topics



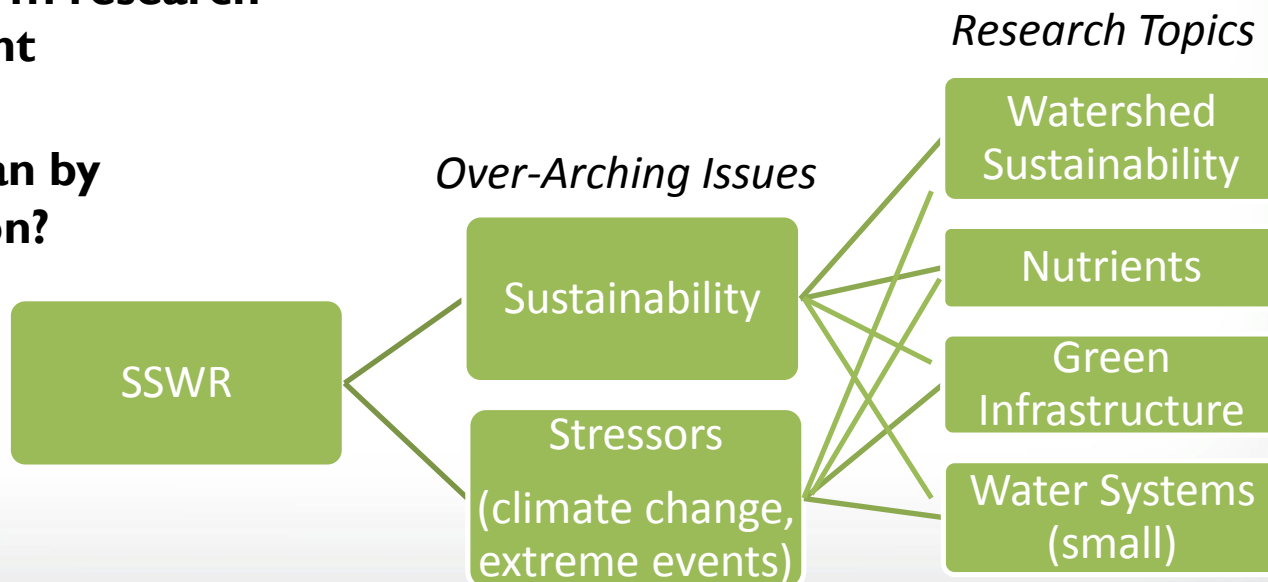


# Strategic Directions

- **Why input at such a high level?**

- **Many EPA partner needs**
- **Many possible directions/topics**
- **Resources and staff are limited**
- **Balance between filling immediate partner needs and longer-term research investment**
- **Many agencies & organizations conduct environmental research**
- **EPA has unique capabilities and niche**
- **Need to maximize impact**

**What do we mean by strategic direction?**





- **BOSC Executive Committee**
  - Provides advice, information and recommendations on technical and management issues
- **Five new BOSC Subcommittees**
  - **ACE, CSS/HHRA, HS, SHC, SSWR**
  - **Chair/Vice-Chair for each on BOSC EC**
  - **Provide periodic advice to the programs**
    - research program design, science quality, innovation, relevance and impact

- **Review of ORD science products**
  - **Report on the Environment**
  - **Chemical assessments (IRIS)**
  - **other**
- **Science advice on priority topics for EPA**
- **Review of the EPA FY16 S&T President's Budget?**



## Charge Questions for the SAB/BOSC

### Overall Questions

- I. a. **Considering the proposed research directions and focus, how well is ORD as a whole poised to support EPA in meeting the goals of the EPA Strategic Plan?**
- I. b. **What are the SAB/BOSC perspectives overall on the proposed research directions providing research to address *environmental issues of 2020 and beyond*?**
- 9. a. **Do ORD's plans, taken collectively, indicate that integration, where appropriate, will develop the needed scientific knowledge and produce results that advance EPA's ability to address complex problems?**



**Fiscal Year 2014-2018 EPA Strategic Plan**  
April 10, 2014

U.S. Environmental Protection Agency  
Washington, D.C. 20460



## Charge Q's for Each Program

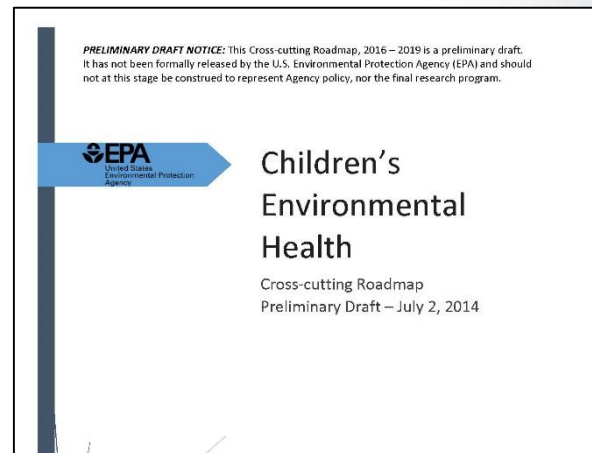
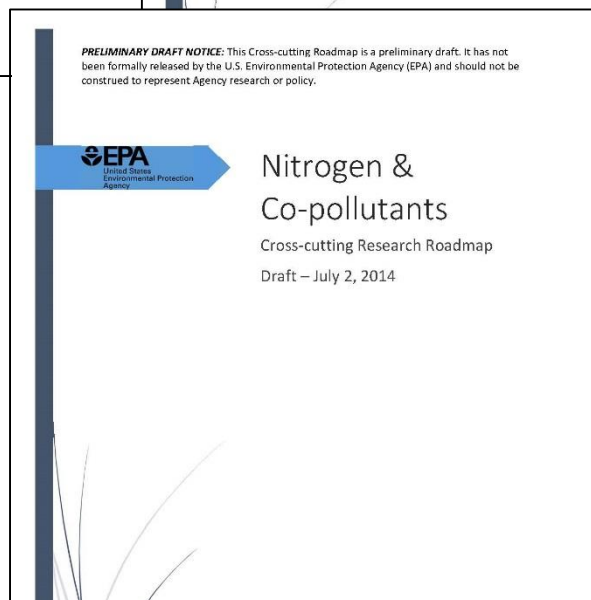
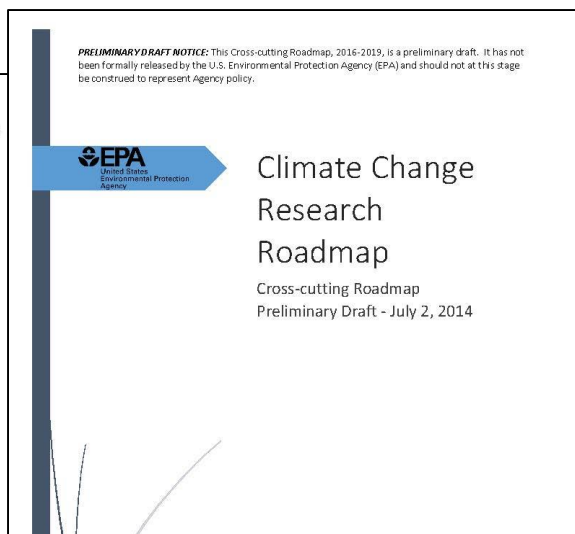
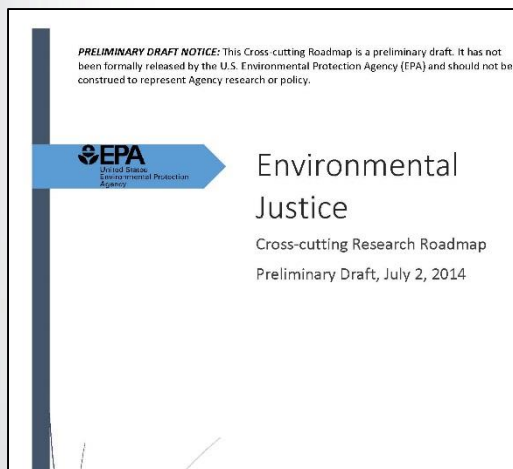
- 2. a. How well will the research directions in each Early Draft StRAP (2016-2019) support EPA in achieving the relevant Agency objectives and cross-cutting strategies, as described in the EPA Strategic Plan (2014 – 2018)?**
- 2. b. What are the SAB/BOSC perspectives on the proposed research directions in each StRAP providing research to address *environmental issues* of 2020 and beyond?**
- 2. c. For each program, do the presentations and plans indicate that ORD is designing for integration, where appropriate, on topics that are relevant to other research programs?**

**Additional specific charge questions articulated for each research program**



# Charge Question for Roadmaps

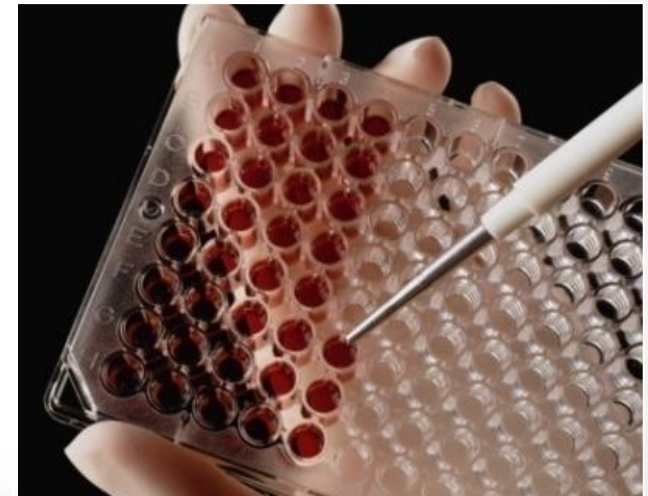
**8a. How effective is each Draft Roadmap in presenting a problem statement, elucidating key research topics, capturing relevant research in each of the six programs, and identifying any important scientific gaps?**



U.S. EPA  
Research and Development  
Washington, DC 20460

## Building expertise for the Future

- Social Science
  - economics, anthropology, psychology
- Computational Science
  - informatics, chemistry
- Monitoring
  - air and water sensors
- Ecological Assessment
  - restoration, energy extraction impacts
- Decision Support
  - GIS expertise, energy modeling



- **Citizen science is volunteers partnering with scientists to answer real-world questions.**
- **What can ORD do with citizen science?**
  - **Reconnect people to the environment and increase understanding of the scientific process.**
  - **Collect data at a scale not possible before.**
  - **Utilize new technologies – mobile internet, apps, online databases, low-cost sensors, social media.**
  - **Use science to engage / empower communities to solve local environmental issues.**
  - **Provide guidance on new technologies (sensors)**





## Perspectives on the Future

**Of all the challenges we face as a nation and as a planet, few are as pressing as the three-pronged challenge of climate change, sustainable development and the need to foster new and cleaner sources of energy.**

*U.S. Office of Science and Technology Policy, 2014*

**The Next Industrial Revolution will fundamentally change the way we make things and where. The transformation to digital fabrication ... will impact everything.**

*The Wilson Center, 2012*

**The emerging field of “synthetic biology” holds great promise...but the US government needs to take precautions to ensure that laboratory-made microbes do not cause unexpected catastrophes.**

*The Presidential Commission for the Study of Bioethical Issues, 2010*

**Global systemic environmental risks include.... greater incidence of extreme weather events, natural catastrophes, and man-made environmental catastrophes; major biodiversity loss and ecosystem collapse; and water crises.**

*World Economic Forum, Global Risks 2014*



- **President's nominee for the Assistant Administrator for ORD announced, Tom Burke**
- **Experience with NAS and BEST**
  - Member of several committees relevant to EPA, including *Science and Decisions*
- **Served on EPA's Science Advisory Board & the Executive Committee of the Board of Scientific Counselors**



*Tom Burke*

